

WATER TEMPERATURE AND THERMAL STRESS EFFECTS ON JUVENILE ATLANTIC SALMON (SALMO SALAR) GROWTH

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Abstract

Water temperature is a key variable for juvenile Atlantic salmon growth. Laboratory studies have determined optimal temperature ranges for juvenile feeding and growth. From these results, growth curves as a function of temperature have been proposed. We developed a potential growth thermal index (PGTI) that allows for the characterization of growth conditions at a specific location, and for a given period, by integrating the thermal conditions that occurred with known salmon thermal preferences for growth. As a first validation, electrofishing surveys on five eastern Canadian rivers were completed to compare juvenile growth with the PGTI values calculated using hourly temperature data gathered during the ice-free period. Results indicate good agreement between the potential growth estimated with the PGTI and the length of juveniles sampled in the electrofishing surveys. In addition, analysis of otoliths from juvenile salmon originating from three eastern Canadian rivers showed a hysteresis effect between growth and temperature, indicating that the PGTI likely overestimates growth in the latter part of the summer. Analysis of specific thermal stress events demonstrate reduced growth during the days following the stress events.

Keywords

fish growth, water temperature, otoliths, thermal stress, atlantic salmon, juveniles